Immune stimulation in European sea bass (*Dicentrarchus labrax*) larvae by administration of Poly-ß-hydroxybutyrate (PHB)

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BACKGROUND

- Major **bottleneck** in aquaculture production: **Mass mortality of fish larvae**
- **Promising solution**: Application of **immunostimulants** such as PHB to **improve the immunocompetence, disease resistance** and **survival rates** of larval fish

QUESTION: Does **PHB stimulate** the **immune system** of newly hatched **fish larvae?**

EXPERIMENTAL APPROACH

✧ Species in focus

European sea bass larva ©fishbase.us

- European sea bass (*Dicentrarchus labrax*)
- Important aquaculture species
- **Newly hatched sea bass larvae** were used for the experiment and fed with **rotifers** three times a day

✧ Immunostimulant in focus

Bacteria containing PHB inclusions

- Poly-ß-hydroxybutyrate (PHB) is a bacterial energy storage compound
- For the experiment freeze-dried **PHB-containing bacteria** (*Alcaligenes eutrophus*) were used
- We used bacteria with a **low PHB content** (2.5%) and with a **high PHB content** (75%) and administered them for 14 days

✧ Experimental design

Setup for larval experiments

Group A:

A.1 Bacteria with **low PHB** content were fed from first-feeding on via **rotifers** and added directly to the **water**

A.2 Bacteria with **low PHB** content only via **rotifers**

Group B:

B.1 Bacteria with **high PHB** content were fed from first-feeding on via **rotifers** and added directly to the **water**

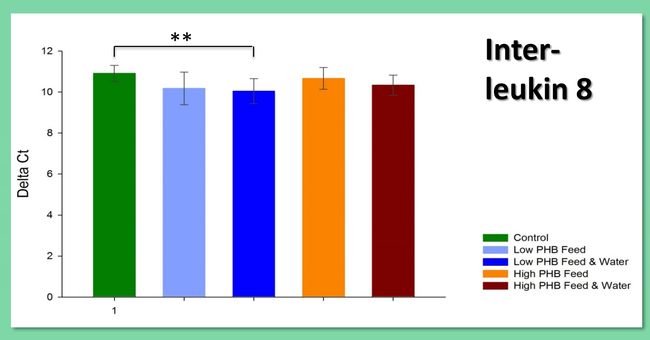
B.2 Bacteria with **high PHB** content only via **rotifers**

Group C: No PHB-containing bacteria via rotifers or in the water

✧ Response variables

- **Immune gene expression analysis**
- **Disease resistance** (bath challenge with *V. anguillarum*)
- Analysis of **gut microbiota composition**
- **Mortality rates**
- Dry weight and length of larvae

✧ Preliminary results - gene expression



IL 8 was **upregulated** in larvae from the „Low PHB Feed & Water“ treatment compared to the Control treatment (no PHB)

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